

Notice of Allowability

Application No.

10/533,441

Examiner

Bernard E. Souw

Applicant(s)

TAKAHASHI ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 12/19/2003 (Transmittal).
2. ☒ The allowed claim(s) is/are 1-4.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date 8/19/2005
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted 5/2/2005 under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. Receipt is acknowledged of information disclosure statement (IDS) submitted on 02/10/2004. The submission is in compliance with the provisions of 37 CFR 1.97.

A signed copy of the information disclosure statement is here enclosed.

ALLOWANCE

3. Claims 1-4 are allowed.

Reasons for Allowance

4. The following is an examiner's statement of reasons for allowance:

The prior art fails to teach a high-speed particle generator or method comprising a target unit for holding a high-speed particle generating target that generates high-speed particles when laser plasma is generated by a pulsed laser beam; a pulsed laser beam generator for generating the pulsed laser beam; a wave-front-compensating system for compensating the wave front of the pulsed laser beam; and an irradiation optical system for condensing at a predetermined condensing point the pulsed laser

beam of which the wave front is compensated by the wave-front-compensating system, the latter comprising a deformable optical system such that an optical operation unit for reflecting or deflecting the pulsed laser beam is deformably constituted; a wave front measuring device; a storing unit for storing the wave front of a reference light measured by using the wave front measuring device; a deformable optical system control unit for compensating the wave front of the pulsed laser beam based on both the reference wave front and the wave front of the pulsed laser beam measured by the wave front measuring device, as recited in claims 1, 2 and 3.

5. A claim 4 is also allowed because of its dependency upon claim 3.

6. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Relevant Prior Art

7. This prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

(a) USPAT 6,767,743 and US-PGPub 2003/0104627 issued to Takayama et al.; USPAT 6,724,004 and US-PGPub 2003/0080302 issued to Yashiro; and USPAT 6,909,764 and US-PGPub 2002/0172317 issued to Maksimchuck et al.; all disclose a high-speed

particle generator or method using a pulsed laser beam. However, the prior art references fail to teach the use of wave front sensor and wave front correction by a deformable mirror to compensate the wave front of the pulsed laser beam based on both the reference wave front and the wave front of the pulsed laser beam measured by the wave front measuring device.

(b) Backus et al., Rev. Sci. 1998 also disclose a high-speed particle generator or method using a pulsed laser beam. However, Backus fails to teach the use of wave front sensor and wave front correction by a deformable mirror to compensate the wave front of the pulsed laser beam, but instead, use pulse compression by chirped-pulse amplification technique to generate a high energy laser pulse of short duration.

(c) Spencer et al. (IDS) and Liu et al. (IDS) also teach a high-speed particle generator or method using a pulsed laser beam. However, neither Spencer nor Liu teaches to use a wave front sensor and wave front correction by a deformable mirror to compensate the wave front of the pulsed laser beam.

(d) USPAT 5,420,436 issued to Seya et al., Akaoka et al. (IDS) and Hawkes et al. (IDS), all three references disclose a pulsed laser beam equipped with a wave front sensor and a wave front correction by deformable mirror to compensate the wave front of the pulsed laser beam based on both the reference wave front and the wave front of the pulsed laser beam measured by the wave front measuring device. However, none of the cited references use the pulsed laser beam in a high-speed particle generator.

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(e) Albert et al. (IDS) teach a high-speed particle generator or method using a pulsed laser beam equipped with a wave front correction by a deformable mirror. However, Albert's wave front correction is not accomplished by compensating the wave front of the pulsed laser beam based on both a reference wave front and a wave front of the pulsed laser beam measured by a wave front measuring device, as recited on pg.1126, 2nd full paragraph, lines 11-23. Instead, Albert's wave front compensation is based on non-linear optics and machine learning through evolutionary algorithm applied to the deformable mirror, as recited on pg.1126, 2nd full paragraph, lines 18-26.

(f) The Group for High Energy Physics at the Institute of Physics, Chinese Academy of Sciences, discloses a high-speed particle generator or method using a pulsed laser beam, including the use of wave front sensor and wave front correction by a deformable mirror. However, the Group's invention was announced in 2003, which was later than the priority date of the present application (12/20/2002).

Communications

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard E Souw, Ph.D., whose telephone number is 571 272 2482. The examiner can normally be reached on Monday thru Friday, 9:00 am to 5:00 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571 272 2312. The central fax phone

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number for the organization where this application or proceeding is assigned is 571 273 8300 for regular communications as well as for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571 272 5993.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

bes

November 06, 2006



NIKITA WELLS
PRIMARY EXAMINER

11/06/06